

**What is claimed is:**

1. A blade shape designing method where a shape of a blade is designed while a plurality of objective functions are optimized, wherein the plurality of objective functions include incidence toughness, and optimization analysis is performed on the plurality of objective functions according to Pareto optimization approach so that Pareto solutions can be found on the basis of consideration of a trade-off relationship between the objective functions.

2. A blade shape designing method according to claim 1, wherein the plurality of objective functions include at least one of a trailing edge deviation angle, a pressure loss coefficient, a maximum slope of blade surface Mach number or pressure distribution, a lift/drag ratio, and a blade load.

3. A blade shape designing method according to claim 1, wherein the incidence toughness is evaluated by the sum of first and second evaluation values of a parameter evaluating the shape, which can be obtained by evaluating the parameter at first and second incident angles whose signs are opposite to each other, with respect to a design point of an incident angle, respectively.

4. A blade shape designing method according to claim 3, wherein the absolute values of the first and second incident angles are  $10^\circ$  or less.

5. A blade shape designing method according to claim 1, wherein the Pareto optimization approach is a Multi-Objective Genetic Algorithm.

6. A computer-readable information medium on which a program is recorded for a computer to execute a blade shape designing method where a shape of a blade is designed while a plurality of objective functions are optimized, wherein the program instructs the computer to execute a step where incidence toughness is set as one of the plurality of objective functions and a step where optimization analysis according to Pareto optimization approach is performed on the plurality of objective functions so that Pareto solutions are obtained on the basis of consideration of a trade-off relationship between the plurality of objective functions.

7. A computer-readable information medium according to claim 6, wherein the plurality of objective functions include at least one of a trailing edge deviation

angle, a pressure loss coefficient, a maximum slope of blade surface Mach number or pressure distribution, a lift/drag ratio, and a blade load.

8. A computer-readable information medium according to claim 6, wherein the incidence toughness is evaluated by the sum of first and second evaluation values of a parameter evaluating the shape, which can be obtained by evaluating the parameter at first and second incident angles whose signs are opposite to each other, with respect to a design point of an incident angle, respectively.

9. A computer-readable information medium according to claim 8, wherein the absolute values of the first and second incident angles are  $10^\circ$  or less.

10. A computer-readable information medium according to claim 6, wherein the Pareto optimization approach is a Multi-Objective Genetic Algorithm.

11. A program for a computer to execute a blade shape designing method where a shape of a blade is designed while a plurality of objective functions are optimized, wherein the program instructs the computer to execute a step where incidence toughness is set as one of the plurality of objective functions and a step where optimization analysis according to Pareto optimization approach is

performed on the plurality of objective functions so that Pareto solutions are obtained on the basis of consideration of a trade-off relationship between the plurality of objective functions.

12. A program according to claim 11, wherein the plurality of objective functions include at least one of a trailing edge deviation angle, a pressure loss coefficient, a maximum slope of blade surface Mach number or pressure distribution, a lift/drag ratio, and a blade load.

13. A program according to claim 11, wherein the incidence toughness is evaluated by the sum of first and second evaluation values of a parameter evaluating the shape, which can be obtained by evaluating the parameter at first and second incident angles whose signs are opposite to each other, with respect to a design point of an incident angle, respectively.

14. A program according to claim 13, wherein the absolute values of the first and second incident angles are  $10^\circ$  or less.

15. A program according to claim 11, wherein the Pareto optimization approach is a Multi-Objective Genetic Algorithm.